About Intersight Kubernetes Service

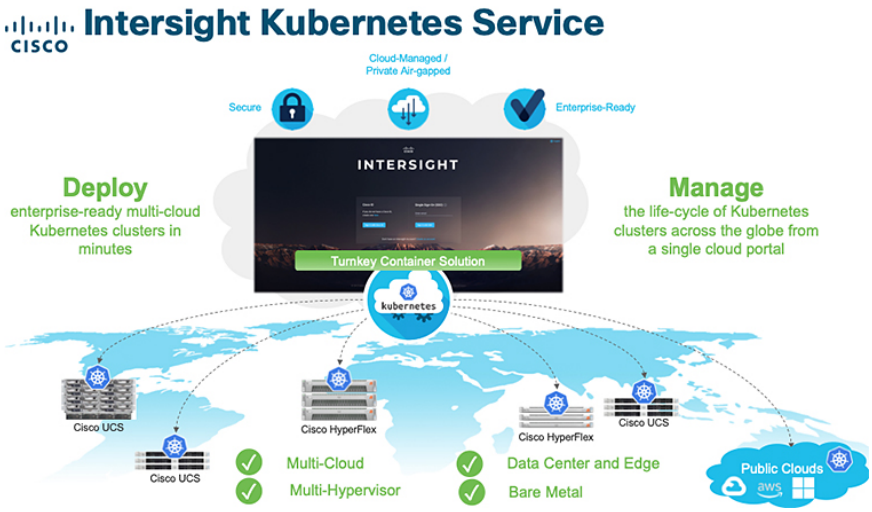
Note Intersight Kubernetes Service (IKS) is currently available as a Beta feature and is not intended for production environments.

The following sections provide information on the main concepts in Intersight Kubernetes Service:

Intersight Kubernetes Service

Overview

IKS integrates the Kubernetes lifecycle management capabilities of Cisco into the Intersight orchestration platform to offer Kubernetes as a service. It enables you to quickly and easily deploy and manage the lifecycle of Kubernetes clusters across the globe using a single cloud portal—Intersight.



IKS is built on 100 percent upstream Kubernetes and works with seamless container networking, enterprise-grade persistent storage, and built-in production-grade security. IKS also comes with a useful collection of add-ons such as logging, and monitoring using the Kubernetes dashboard.

Roles and privileges

Intersight provides Role-Based Access Control (RBAC) to authorize or restrict system access to a user, based on user roles and privileges. A user role in Intersight represents a collection of the privileges a user has to perform a set of operations and provides granular access to resources. Intersight provides role-based access to individual users or a set of users under Groups. For the complete list of roles and privileges in Intersight and details on managing roles and privileges see Role Based Access Control in Intersight.

The following table describes the supported System-defined roles in IKS, their corresponding permissions, and restrictions:

Intersight Kubernetes Service Roles	Permissions	Restrictions
Kubernetes Administrator	You can create, edit, deploy, and manage Kubernetes clusters. You can also view all the cluster dashboard widgets and the cluster details. Additionally, you also have privileges to view and manage the storage devices associated with the Kubernetes clusters. The capability to view and execute workflows against the Kubernetes clusters is also granted. It also allows you to run workflows to manage VMs on hypervisor endpoints, and manage connected storage, and create and view IP pools.	This role does not include the ability to claim a device. You must have a Device Technician, Device Administrator, or an Account Administrator role to claim a device.
Kubernetes Operator	You can view Kubernetes Clusters. You can also view all the cluster dashboard widgets, and view cluster details. Additionally, you also have privileges to view storage devices associated with the Kubernetes clusters. The capability to view workflows is also granted. It also allows the user to view VMs on hypervisor endpoints.	This role does not include the ability to claim a device. You must have a Device Technician, Device Administrator, or an Account Administrator role to claim a device.

Kubernetes Cluster Profiles

IKS enables you to create cluster profiles to configure Kubernetes clusters. A cluster profile is associated with only one cluster. A cluster profile contains information such as the infrastructure provider, the target environment, and the node configuration. IKS enables you to set these configurations by choosing existing Kubernetes policies or by creating new policies.

After a cluster profile is configured, you can choose to deploy the cluster profile immediately, or save the cluster profile and deploy it later.

For more information, see Deploying Kubernetes Cluster Profiles.

Kubernetes Cluster Policies

Policies in IKS define the configurations that can be used across multiple cluster profiles. Using policies helps you to quickly and easily update multiple cluster profile configurations. Whenever you update a policy, the changes apply to all cluster profiles that use the policy. Thus, you can make the changes in a single location, rather than searching for and updating multiple instances.

For more information on the IKS policies that you can configure on Intersight, see **Managing Kubernetes Policies**.

Kubernetes Multi-cluster Dashboard

The Kubernetes multi-cluster dashboard displays the status of all your Kubernetes clusters.

The Connection status widget groups the connected and not connected clusters. You can click the widget to filter the clusters that are connected and not connected.

To customize the Kubernetes Cluster Table View, you can click **Settings** (**Gear** icon) and choose the columns that you want in the Table view. Using the **Search** field, you can filter the clusters displayed in the Table view by searching on one or more attributes. You can sort the table data based on the **Name** and **Status** fields. The data displayed in the Table view can be exported to a CSV file using the **Export** icon.

The following table describes the attributes of the Kubernetes Cluster Table view.

Field	Description
Name	The name of the Kubernetes cluster. You can click a cluster name to view the details view of the cluster.
Status	The status of the Kubernetes cluster. **Note** A cluster in the **Connected** status indicates that the cluster is connected to the Kubernetes API Server. If a cluster is in the **Not Connected** status, you can try to redeploy the cluster or open a TAC case. For more information, see **Deploying Kubernetes Cluster Profiles** and **Opening TAC Case**.
Last Update	The date on which the Kubernetes cluster was last updated.
Associated Profile	The profile associated with the cluster. **Note** You can click the profile to quickly access the profile associated with a cluster.
Profile Status	The status of the profile.
Organization	The organization to which the Kubernetes cluster profile belongs.

For more information, see **Kubernetes Cluster Management**.

Kubernetes Cluster Details View

You can click a cluster name from the Kubernetes Cluster Table to view the details the cluster configuration. The Kubernetes Cluster Details view has the following tabs:

- **Monitor:** This tab provides an overview of the cluster details and its inventory.

  You can view the following information in the **Details** pane:

  - Status
  - Name
  - Description
  - Infra/Cloud Provider
  - K8s Cluster API Address
  - Storage Class
  - K8s Version
  - Master Nodes
  - Worker Nodes
  - IP Pool
  - CNI Type
  - Load Balancers
  - Add Ons
  - Tags: You can click Set and enter the metadata that you want to associate with the cluster object.

  The widgets in the Inventory pane summarises the resources used by the cluster and its status. You can view the following widgets in the Inventory pane:

  - Node Pools
  - Node Pools by Infra Clusters
  - Nodes
  - Node Status
  - Active Networks
  - Total Add-ons

- **Operate:** This tab provides the details of the resources configured for the cluster. You can click each section to view the next level of details and the corresponding widgets. The widgets also enable you to filter the data in the table displayed in these panes.The sections in the **Operate** tab are as follows:

  - **Nodes:** The **Node Status** and **Node Pools** widgets are displayed in the **Nodes** pane. The nodes in your cluster are displayed in the table view. You can click the name of a node from the table to view the infrastructure on which the node runs.

- **Node Pools:** The **Node Pool Status**, **Node Pool Types**, **Hypervisor Managers**, and **Datacenters** widgets are displayed in the **Node Pools** pane. You can click the name of a node pool from the table to view the virtualization objects associated with the node pool.
- **IP Pools:** You can view the IP pools associated with the cluster in the table displayed in the **IP Pools** pane.
- **Container Runtime:** You can view the container runtime information that is configured for the cluster.
- **Add-ons:** The **Add-on Status**, **Upgrade Strategy**, and **Add-on Version** widgets are displayed in the **Add-ons** pane.

For more information, see **Kubernetes Cluster Management**.

Getting Started

This chapter covers only IKS-specific information, for detailed information about getting started with Intersight, see the Getting Started section on Intersight Help Center.

Supported Features Matrix

Features	SaaS	Connected Virtual Appliance	Private Virtual Appliance
Intersight Kubernetes Service	Yes	No	No

For more information, see Supported Features Matrix on Intersight Help Center.

Intersight Licensing Requirements

Features	Base	Essentials	Advantage	Premier
Intersight Kubernetes Service	No	No	No	Yes Beta Feature

For more information, see Intersight Licensing on Intersight Help Center.

Deploy Cisco Intersight Assist

Cisco Intersight Assist helps you add endpoint devices to Cisco Intersight. A datacenter could have multiple devices that do not connect directly with Cisco Intersight. Any device that is supported by Cisco Intersight but does not connect directly with it, will need a connection mechanism. Cisco Intersight Assist provides that connection mechanism, and helps you add devices into Cisco Intersight. For more information about deploying Intersight Assist and for the right sizing for other Intersight features, see the Cisco Intersight Assist Getting Started Guide.

Resource Requirements for Intersight Assist

Note You can deploy Cisco Intersight Assist on VMware ESXi 6.7U3+ or vCenter 6.7U3+.

The following table describes the resource requirements to install and deploy Cisco Intersight Assist for Intersight Kubernetes Service.

Resource Requirement	System Requirements	
-	Small	Medium
vCPU	16	24
RAM (GiB)	32	64
Storage (Disk in GiB)	500	500
Deploy Configuration	25 Kubernetes clusters	100 Kubernetes clusters
Supported Hypervisors	ESXi 6.7U3+ or vCenter 6.7U3+	ESXi 6.7U3+ or vCenter 6.7U3+

Kubernetes Cluster Management

You can create Kubernetes clusters and manage the end-to-end lifecycle of these clusters.

The following sections provide information about the cluster management tasks that you can perform:

Deploying Kubernetes Cluster Profiles

Before you begin

Before you proceed with deploying a Kubernetes cluster, you must:

- Download and deploy Intersight Assist OVA on your vCenter.
- Claim Intersight assist and VMware vCenter on Intersight.

  For information on Intersight Assist, see Cisco Intersight Assist Getting Started Guide.

You must also ensure that:

- vCenter has access to Intersight to import the tenant OVA.
- The datastore used in a node pool is attached to all the hosts in that cluster (Only for ESXi clusters).
- The network interface used in a node pool is attached to all the hosts in that cluster (Only for ESXi clusters).
- Intersight Assist has access to vCenter and all IKS tenant VMs.
- All IKS tenant VMs have access to vCenter.

To create and deploy a Kubernetes cluster profile:

1. In the left pane, click **Profiles**.

2. Click the **Kubernetes Cluster Profiles** tab.

   The list of available profiles is displayed.

3. Click **Create Kubernetes Cluster Profile**.

   The **Kubernetes Cluster Profile** wizard appears.

4. To configure the name, description, and tag for the cluster, in the **General** screen:

   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the Kubernetes cluster profile should belong.

Note An Organization is a logical entity that enables multi-tenancy through a separation of resources.

   b. In the **Cluster Name** field, enter a name for the cluster profile.

   c. In the **Add Tag** field, enter the metadata that you want to associate with the cluster profile.

      Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

   d. In the **Description** field, enter a description for the cluster profile.

      Description is an optional field.

   e. Click **Next**.

5. To configure the network, system, and SSH settings, in the **Cluster Configuration** screen:

   a. Under **IP Pool**, click **Select IP Pool**, and then do one of the following steps:

      - Click **Create New** to create a new IP pool.

        For more information on creating a new IP pool, see Intersight Managed Mode Configuration Guide.

      - Choose a pre-configured IP pool.

        You can click the **Eye** icon to view the details of the IP pool.

   b. In the **Load Balancers** field, enter the number of load balancer IP addresses for this cluster.

   c. The **SSH User** field displays the SSH username as **iksadmin**.

      This field is not editable.

   d. In the **SSH Public Key** field, enter the SSH public key that you want to use for creating the cluster.

Note We recommend that you use only Ed25519 or ECDSA format for the public key.

You can use the `ssh-keygen` command to generate an SSH key pair.

For example: `ssh-keygen -t ed25519`

   e. Under **Policies**, configure the following policies:

1. Expand **DNS, NTP and Time Zone** and fill the details, or click **Select Policy**, and then choose a pre-configured policy.

   For more information on creating a new policy, see **Creating DNS, NTP, and Timezone Policy**.

2. Expand **Network CIDR** and fill the details, or click **Select Policy**, and then choose a pre-configured policy.

   For more information on creating a new policy, see **Creating Network CIDR Policy**.

3. If you want to add **Trusted Registries**, expand **Trusted Registries** and enter the policy details, or choose a pre-configured policy.

   For more information, see **Creating Trusted Certificate Authorities Policy**.

4. If you want to add a **Container Runtime Policy**, expand **Container Runtime Policy** and enter the policy details, or choose a pre-configured policy.

   For more information, see **Creating Container Runtime Policy**.

f. Click **Next**.

6. To configure the master node pools, in the **Control Plane Node Pool Configuration** screen:

a. Under **Control Plane Node Configuration**, in the **Counts** field, enter the number of master nodes that you want.

Note You can create a single master or multi-master. We recommend that you limit the number of master nodes to the tested configuration of three master nodes.

b. Under **Kubernetes Version**, click **Select Version**, and then do one of the following steps:

- Click **Create New** to create a new policy. For more information, see **Creating Kubernetes Version Policy**.
- Choose a pre-configured policy.

  You can click the **Eye** icon to view the details of the policy.

c. Under **IP Pool**, click **Select IP Pool**, and then do one of the following steps:

- Create a new IP Pool policy.

  For more information on creating an IP pool, see Intersight Managed Mode Configuration Guide.

- Choose a pre-configured IP pool policy.

You can click the **Eye** icon to view the details of the policy.

d. Under **Kubernetes Labels**, enter the key-value pair.

e. Under **Virtual Machine Infrastructure Provider**, click **Select Infra Provider**, and then do one of the following steps:

- Click **Create New** to create a new policy.

  For more information, see **Creating Infra Provider Policy**.

- Choose a pre-configured policy.

  You can click the **Eye** icon to view the details of the policy.

f. Under **Virtual Machine Instance Type**, click **Select Instance Type**, and then do one of the following steps:

- Click **Create New** to create a new policy.

  For more information, see **Creating Infra Provider Policy**.

- Choose a pre-configured policy.

You can click the **Eye** icon to view the details of the policy.

g. Click **Next**.

7. To configure worker node pools, in the **Worker Node Pools Configuration** screen:

a. Click **Add Worker Node Pool**.

b. In the **Name** field, enter a name for the worker node pool.

c. Under **Worker Node Configuration**, in the **Counts** field, enter the number of worker nodes that you want.

Note We recommend that you limit the number of worker nodes to the tested configuration of 24 worker nodes.

d. Under **Kubernetes Version**, click **Select Version**, and then do one of the following steps:

- Click **Create New** to create a new policy. For more information, see **Creating Kubernetes Version Policy**.
- Choose a pre-configured policy.

  You can click the **Eye** icon to view the details of the policy.

e. Under **IP Pool**, click **Select IP Pool**, and then do one of the following steps:

- Create a new IP Pool policy.

  For more information on creating an IP pool, see Intersight Managed Mode Configuration Guide.

- Choose a pre-configured IP pool policy.

You can click the **Eye** icon to view the details of the policy.

f. Under **Kubernetes Labels**, enter the key-value pair.

g. Click **Add**.

h. Click **Next**.

8. To configure storage and optional add-ons, in the **Add-on Configuration** screen:

Note Add-on configuration is optional.

a. Click **Add Add-on**.

b. Under **Add-on Policy**, click **Select Add-on**, and then do one of the following steps:

- Click **Create New** to create a new policy.

  For more information, see **Creating Add-on Policy**.

- Choose a pre-configured policy.

You can click the **Eye** icon to view the details of the policy.

c. Click **Next**.

9. To review and deploy or save the cluster profile do one of the following steps in the **Summary** screen:

- If you want to deploy the cluster profile, verify the configuration, and then click **Deploy**.

  You can click the **Requests** icon displayed in the menu bar to view the status of your cluster deployment. For more information, see Monitoring Progress of Kubernetes Cluster Requests.

  The cluster deployment takes a few minutes to complete. The newly created cluster is displayed on the **Kubernetes Cluster Table View**.

- If you want to save the cluster profile and deploy it later, click **Close** to exit the profile.

The cluster profile is listed in the **Profiles** screen. You can select the profile and click the **Edit** icon to edit the profile.

Viewing the Kubernetes Cluster Profiles

To view a Kubernetes cluster profile:

1. In the left pane, click **Profiles**.
2. Click the **Kubernetes Cluster Profiles** tab.

   The list of available profiles is displayed in the Kubernetes Cluster profile table.
3. To customize the Table view, click **Settings** (**Gear** icon), and then choose the columns that you want in the Table view.
4. To filter the clusters displayed in the Table view, search using one or more attributes.
5. To sort the table data based on the **Name** and **Status** fields, use the **Sort** icon.
6. To export the data displayed in the Table view to a CSV file, use the **Export** icon.

The following table describes the attributes of the Kubernetes Cluster profile table.

Field	Description
Name	The name of the Kubernetes cluster profile.

Field	Description
Status	The status of the Kubernetes cluster profile.
Kubernetes Version	The version of Kubernetes attached to the Kubernetes cluster profile.
Cloud Provider	The cloud provider associated with the cluster.
Master Node	The number of master node pools configured for the cluster.
Worker Node	The number of worker node pools configured for the cluster.
Last Update	The date on which the Kubernetes cluster profile was last updated.
Organization	The organization to which the Kubernetes cluster profile belongs.

Scaling Node Pools

Node pools enable you to create a group of nodes within a cluster. All nodes in the group have the same configuration.

To add a node pool to a cluster:

1. In the left pane, click **Profiles**.
2. Click the **Kubernetes Cluster Profiles** tab.

   The list of available profiles is displayed.
3. Select the profile that is associated with the cluster that you want to scale, and click the **Edit** icon.
4. Go to the **Node Pools Configuration** screen to scale the worker nodes:
   a. Under **Worker Node Pool**, click **Add Worker Node Pools** to add a worker node pool.

      The **Add Worker Node Pools** screen appears.
   b. In the **Name** field, enter a name for the worker node pool.
   c. Under **Worker Node Configuration**, in the **Counts** field, enter the number of worker nodes that you want.

Note You can create a maximum of only 20 worker nodes.

   d. Under **IP Pool**, select an IP pool policy.
   e. Under **Kubernetes Labels**, enter the key-value pair.
   f. Click **Add**.

5. Click **Next** until you reach the **Summary** screen and click **Deploy** for the changes to take effect.

Downloading Kubeconfig File

The Kubeconfig file is used to configure access to the Kubernetes clusters on vSphere.

To download the Kubeconfig file of a cluster:

1. In the left pane, click **Kubernetes**.
2. For the cluster environment you want to download, click the Ellipsis (…) icon, and then choose **Download Kubeconfig**.

The `Kubeconfig` file that contains the cluster information and the certificates required to access clusters is downloaded to your local system.

Undeploying Kubernetes clusters

Undeploying a Kubernetes cluster deletes the cluster but retains the associated cluster profile. You can reuse the cluster profile to deploy another cluster.

To undeploy a cluster:

1. In the left pane, click **Kubernetes** or **Profiles**.
2. For the cluster profile you want to undeploy, click the Ellipsis (…) icon, and then choose **Undeploy Cluster**.

The Kubernetes cluster is undeployed.

Opening TAC Case

Intersight enables Cisco TAC to automatically generate and upload Tech Support Diagnostic files when a Service Request is opened.

To open a TAC case for Intersight Kubernetes Service:

1. In the left pane, click **Kubernetes**.
2. For the cluster environment you want to troubleshoot, click the Ellipsis (…) icon, and then choose **Open TAC Case**.
3. In the **Cisco Support Case Manager UI**, add the details of your case, and then click **Submit**.

Deleting Kubernetes Clusters

Deleting a Kubernetes cluster deletes the cluster and the cluster profile associated with the cluster.

To delete a cluster:

1. In the left pane, click **Profiles**.
2. For the cluster you want to delete, click the Ellipsis (…) icon, and then choose **Delete**.

The Kubernetes cluster is deleted.

Monitoring Progress of Kubernetes Cluster Requests

The **Requests** pane displays the progress of deployment and configuration tasks of a cluster. You can review the progress of each step for troubleshooting purposes.

To monitor the progress and history of the tasks associated with the Kubernetes cluster requests:

1. Click the **Requests** icon from the top-right corner of your screen.

   The **Requests** pane appears on the left pane, displaying the active and completed requests in the last 24 hours. You can click **View All** to view older requests.

2. Click the name of the cluster task.

The details of the workflow is displayed.

Obtaining Ingress IP Address of the Ingress Controller LoadBalancer

The Ingress IP address is used to access optional add-ons that use an Ingress resource. You can obtain the Ingress IP address using the kubectl utility.

To obtain the Ingress IP address:

1. Download the Kubeconfig file for the cluster.

   For more information, see **Downloading Kubeconfig File**.

2. Obtain the Ingress IP address of the LoadBalancer using the Kubeconfig file.

```
kubectl --kubeconfig kubeconfig.yaml -n iks get svc
essential-nginx-ingress-ingress-nginx-controller -o
jsonpath='{.status.loadBalancer.ingress[0].ip}
```

Accessing Kubernetes Clusters

You can access clusters using the Kubernetes dashboard and the Kubernetes default token.

To access a Kubernetes cluster:

1. Follow these steps to get the Kubernetes default token using the kubectl utility and the Kubeconfig file (see **Downloading Kubeconfig File**).

   a. List the Kubernetes secrets in the kube-system namespace.

   ```
   kubectl get secrets -n kube-system
   ```

   b. Search for the secret that has the following format:

   ```
   default-token-XXXXX
   ```

   c. Get the default token in one of the following ways:

   - `kubectl describe secret default-token-XXXXX -n kube-system`
   - ``kubectl get secret default-token-XXXXX -n kube-system -o jsonpath='{.data.token}' | base64 -d``

2. Follow these steps to set up the Kubernetes dashboard access:

   a. Obtain the Ingress IP address.

For more information, see **Obtaining the Ingress IP Address of the Ingress Controller LoadBalancer**.

b. Navigate to the Kubernetes Dashboard:

https://<ingress-ip>/dashboard/

The Kubernetes Dashboard login screen is displayed.

c. To log in to the Kubernetes Dashboard, click the **TOKEN** radio button and enter the token you got from Step 1-iii.

Accessing Monitoring Dashboard

It is recommended to continuously monitor the health of your cluster deployment to improve the probability of early detection of failures and avoid any significant impact from a cluster failure.

Monitor is an optional add-on that can be deployed to a cluster. Once installed, Prometheus and Grafana, are available to monitor various metrics from the cluster.

Prometheus collects the data from the cluster deployment, and Grafana provides a general purpose dashboard for displaying the collected data. Grafana offers a highly customizable and user-friendly dashboard for monitoring purposes.

Prometheus is an open-source systems monitoring and alerting toolkit and Grafana is an open source metric analytics and visualization suite.

1. Access the Grafana Dashboard as follows:

   a. Obtain the Ingress IP address.

   For more information, see **Obtaining the Ingress IP Address of the Ingress Controller LoadBalancer**.

   b. Navigate to the Grafana login page:

   https://<ingress-ip>/monitor/

   The Grafana login page is displayed.

2. Follow these steps to access Grafana:

   Use the kubectl utility and the kubeconfig file (see **Downloading Kubeconfig File**)

```
export GRAFANA_USER=$(kubectl get secret monitor-grafana -n iks
-o=jsonpath='{.data.admin-user}' | base64 --decode)
export GRAFANA_PASSWORD=$(kubectl get secret monitor-grafana -n iks
-o=jsonpath='{.data.admin-password}' | base64 --decode)
echo $GRAFANA_USER
echo $GRAFANA_PASSWORD
```

Monitoring Logs from Cluster Deployments

The Elasticsearch, Fluentd, and Kibana (EFK) stack enables you to collect and monitor log data from containerized applications for troubleshooting or compliance purposes. These components are optional.

Fluentd is an open source data collector. It works at the backend to collect and forward the log data to Elasticsearch.

Kibana is an open source analytics and visualization platform designed to work with Elasticsearch. It allows you to create rich visualizations and dashboards with the aggregated data.

Viewing EFK Logs Using Kibana

To access the Kibana UI and view the data from outside a cluster:

1. Follow these steps using the kubectl utility and the kubeconfig file (see **Downloading Kubeconfig File**) to create a port forward:
   a. Determine the pod.

   ```
   kubectl -n iks get pods
   ```

   Example

   ```
   efk-kibana-6d7c97575c-9qxbf
   ```

   b. Open a port forward.

   Example

   ```
   kubectl port-forward -n iks
   efk-kibana-6d7c97575c-9qxbf 5601:5601
   ```

2. Access the Kibana UI and view the data from the target tenant cluster using a web browser.

   http://localhost:5601/app/kibana

Managing Kubernetes Policies

The following sections provide information about the IKS policies that you can configure on Intersight.

Creating Add-on Policy

Add-ons are Kubernetes applications that provide enhanced features to Kubernetes clusters.

Many of the core add-ons are automatically created when you deploy a cluster. For example, nginx-ingress, cert-manager, and metallb. Optional add-ons can be added any time later according to your requirement. For example, logging, monitoring, and UI dashboard for management.

To create an add-on policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.
3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **Add-ons**, and then click **Start**.
4. In the **General** screen:
   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.
   b. In the **Name** field, enter a name for the policy.
   c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

d. In the **Description** field, enter a description for the policy.

Description is an optional field.

e. Click **Next**.

5. In the **Policy Details** screen, under **Add-ons**, click **Add Add-on**.

a. Click **Add Add-on**.

b. From the **Add-on Definition** drop-down list, choose an add-on:

- **kubernetes-dashboard**: To deploy and manage your applications.
- **ccp-monitor**: To monitor the cluster.
- **efk**: To collect and monitor log data from your applications for troubleshooting purposes.

c. Skip the **Overrides** field.

d. From the **Upgrade Strategy** field, select one of the following options:

- No Action
- Upgrade Only
- Reinstall on Failure
- Always Reinstall

e. Click **Add**.

f. If you want to include more add-ons in the policy, repeat these steps for each add-on.

g. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating Container Runtime Policy

The policy for Container Runtime enables you to configure the proxy settings for a cluster profile.

To create a Container Runtime policy:

1. In the left pane, click **Policies**.

The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.

3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **Container Runtime**, and then click **Start**.

4. In the **General** screen:

a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.

b. In the **Name** field, enter a name for the policy.

c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

d. In the **Description** field, enter a description for the policy.

Description is an optional field.

e. Click **Next**.

5. In the **Policy Details** screen:

a. Under **Docker HTTP Proxy**:

1. From the **Protocol** drop-down list, choose the protocol for the HTTP proxy server.
2. In the **Hostname** field, enter the FQDN or IP address of the HTTP proxy server.
3. In the **Port** field, enter the port number for the HTTP proxy server.
4. In the **Username** field, enter the username of the HTTP proxy server.
5. In the **Password** field, enter the password of the HTTP proxy server.

b. Under **Docker HTTPS Proxy server**:

1. From the **Protocol** drop-down list, choose the protocol for the HTTPS proxy server.
2. In the **Hostname** field, enter the FQDN or IP address of the HTTPS proxy server.
3. In the **Port** field, enter the port number for the HTTPS proxy server.
4. In the **Username** field, enter the username of the HTTPS proxy server.
5. In the **Password** field, enter the password of the HTTPS proxy server.
6. In the **Docker Bridge Network CIDR** field, enter a valid CIDR to override the default Docker bridge.
7. In the **Docker No Proxy** field, add the host that you want to exclude from proxy.

c. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating DNS, NTP, and Timezone Policy

The policy for DNS, NTP, and Timezone enables you to configure the DNS, NTP, and timezone for your cluster profile.

To create a DNS, NTP, and Timezone policy:

1. In the left pane, click **Policies**.

The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.

3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **DNS, NTP and Timezone**, and then click **Start**.
4. In the **General** screen:
   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.
   b. In the **Name** field, enter a name for the policy.
   c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

      Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.
   d. In the **Description** field, enter a description for the policy.

      Description is an optional field.
   e. Click **Next**.
5. In the **Policy Details** screen:
   a. From the **Timezone** drop-down list, choose the timezone for the system clock of your node.
   b. In the **DNS Suffix** field, enter the DNS search domain name.
   c. In the **DNS Server** field, enter the IP address of the DNS server.
   d. In the **NTP Server** field, enter the IP address of the NTP server.
   e. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating Kubernetes Version Policy

The policy for Kubernetes Version enables you to configure the Kubernetes version for your cluster profile.

To create a Kubernetes version policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.
2. Click **Create Policy** to create a new policy.
3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **Kubernetes Version**, and then click **Start**.
4. In the **General** screen:
   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.
   b. In the **Name** field, enter a name for the policy.
   c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

      Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

d. In the **Description** field, enter a description for the policy.

   Description is an optional field.

e. Click **Next**.

5. In the **Policy Details** screen:
   a. Choose the Kubernetes version that you want to attach to this policy.
   b. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating Network CIDR Policy

The policy for Network CIDR enables you to configure the internal networks in a Kubernetes cluster.

To create a network CIDR policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.
3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **Network CIDR**, and then click **Start**.
4. In the **General** screen:
   a. From the **Organization** drop-down list, choose the **`default`** organization or a specific organization to which the policy should belong.
   b. In the **Name** field, enter a name for the policy.
   c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

      Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

   d. In the **Description** field, enter a description for the policy.

      Description is an optional field.

   e. Click **Next**.

5. In the **Policy Details** screen:
   a. In the **Service CIDR** field, enter the CIDR block from which the IP address for the cluster service can be allocated.
   b. In the **Pod Network CIDR** field, enter the CIDR block from which the IP address for the pod network can be allocated.
   c. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating Trusted Certificate Authorities Policy

The policy for Trusted Certificate Authorities enables you to configure the trusted certificates for your cluster profile.

To create a Trusted Certificate Authorities policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.
3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **Trusted Certificate Authorities**, and then click **Start**.
4. In the **General** screen:
   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.
   b. In the **Name** field, enter a name for the policy.
   c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

      Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

   d. In the **Description** field, enter a description for the policy.

      Description is an optional field.

   e. Click **Next**.
5. In the **Policy Details** screen:
   a. In the **Root CA Registries** field, add the root CS certificate that allows tenant clusters to securely connect to additional services.
   b. In the **Unsigned Registries** field, add the docker registries created with unsigned certificates.
   c. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating VM Instance Type Policy

The policy for VM Instance Type enables you to configure the system disk size, number of CPUs, and memory of the Virtual Machines.

To create a VM Instance Type policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Click **Create Policy** to create a new policy.
3. In the **Select Policy Type** screen, click **Kubernetes Cluster** > **VM Instance Type**, and then click **Start**.
4. In the **General** screen:

a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.

b. In the **Name** field, enter a name for the policy.

c. In the **Add Tag** field, enter the metadata that you want to associate with the policy.

   Add Tag is an optional field. If you are adding a tag, you must enter the tag in the **`key:value`** format. This tag will be used internal to Intersight.

d. In the **Description** field, enter a description for the policy.

   Description is an optional field.

e. Click **Next**.

5. In the **Policy Details** screen:

   a. In the **CPU** field, enter the number of CPUs you want to allocate to the Virtual Machine.

   b. In the **System Disk Size** field, enter the disk capacity along with its units.

      For example, **`10GiB`**.

   c. In the **Memory** field, enter the memory for the virtual machine in mebibytes.

   d. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Creating Infra Provider Policy

The policy for Infra Provider enables you to configure the infrastructure provider that you want to use.

To create an Infra Provider policy:

1. In the **General** screen:

   a. From the **Organization** drop-down list, choose the default organization or a specific organization to which the policy should belong.

   b. In the **Name** field, enter a name for the policy.

   c. In the **Set Tags** field, enter the metadata that you want to associate with the policy.

      Set Tags is an optional field. If you are adding tags, you must enter the tags in the **`key:value`** format. These tags will be used internal to Intersight.

   d. In the **Description** field, enter a description for the policy.

      Description is an optional field.

   e. Click **Next**.

2. In the **Policy Details** screen:

   a. If you want to use vCenter as the infrastructure provider:

      1. Click the **vCenter** tab.

      2. Select a vCenter provider from the table.

3. From the **Datastore** drop-down list, choose the datastore that you want to use.
4. In the **vSphere Admin Passphrase** field, enter the vSphere passphrase.

b. In the **Resource Pool** field, enter a resource pool.

For more information on finding the resource pool name from vCenter, see **Finding the Resource Pool Name**.

c. In the **Interface** field, enter the name of the portgroup or network that is to be attached to the Kubernetes cluster virtual machines. This network should be associated with the Hypervisor cluster that you selected earlier.

For more information on finding the network name from vCenter, see **Finding the Network Interface Name**.

d. If you want to use HyperFlex as the infrastructure provider:

1. Click the **HyperFlex** tab.
2. Select a HyperFlex provider from the table.

e. Click **Create**.

The newly created policy is displayed in the **Policies** screen.

Finding the Resource Pool Name

To find the resource pool name from vCenter:

1. Navigate to the vCenter server:

   `https://<vCenter_SERVER>`
2. From the links listed on the left side of your screen, click **Browse objects managed by vSphere**.
3. Enter the username and password of the vCenter server.

   The **Managed Objects Home page** appears.
4. In the **Properties** section, in the row on **content**, click content under the **VALUE** column.

Name	TYPE	VALUE
content	servicecontent	content

5. In the page that opens, in the row on **rootFolder**, click **group-xx**.

   For example:

Name	TYPE	VALUE
rootFolder	ManagedObjectReference:Folder	group-d1 (Datacenters)

6. In the page that opens, in the row on **childEntity**, click **datacenter-x** in which the host is located.

   For example:

Name	TYPE	VALUE
childEntity	ManagedObjectReference:ManagedEntity	datacenter-2 (Hyperflex)

7. In the page that opens, in the row on **hostFolder**, click **group-hx**, which is the desired host group.

   For example:

Name	TYPE	VALUE
hostFolder	ManagedObjectReference:Folder	group-h4 (host)

8. In the page that opens, in the row on **childEntity**, click **domain-xxxx**, which is the domain of the desired host.

   For example:

Name	TYPE	VALUE
childEntity	ManagedObjectReference:ManagedEntity[]	domain-c108 (hx1)

9. In the page that opens, in the row on **resourcePool**, click **resgroup-xxx**, which is the resource pool group

   For example:

Name	TYPE	VALUE
resourcePool	ManagedObjectReference:ResourcePool	resgroup-109 (Resources)

10. In the page that opens, in the row on **resourcePool**, click **resgroup-xxxx**, which is the the desired resource pool.

    For example:

Name	TYPE	VALUE
resourcePool	ManagedObjectReference:ResourcePool[]	resgroup-45677 (iks-resource)

11. In the page that opens, in the row on **name**, copy the name of the resource. This value is to be used in the **Resource Pool** field in the Infra Provider policy wizard.

    For example:

Name	TYPE	VALUE
name	string	iks-resource

    Here, **iks-resource** is the value you must provide in the **Resource Pool** field.

Note If there are spaces or special characters in the name string, you need to encode it using a URL encoder.

Finding the Network Interface Name

To find the network interface name from vCenter:

1. Navigate to the vCenter server:

   ```
   https://<vCenter_SERVER>
   ```

2. From the links listed on the left side of your screen, click **Browse objects managed by vSphere**.
3. Enter the username and password of the vCenter server.

   The **Managed Objects Home page** appears.

4. In the **Properties** section, in the row on **content**, click **content** under the **VALUE** column.

Name	TYPE	VALUE
content	servicecontent	content

5. In the page that opens, in the row on **rootFolder**, click **group-xx**.

   For example:

Name	TYPE	VALUE
rootFolder	ManagedObjectReference:Folder	group-d1 (Datacenters)

6. In the page that opens, in the row on **childEntity**, click **datacenter-x** in which the host is located.

   For example:

Name	TYPE	VALUE
childEntity	ManagedObjectReference:ManagedEntity	datacenter-2 (Hyperflex)

7. In the page that opens, in the row on **network**, click **network-xx**, which is the desirednetwork.

   For example:

Name	TYPE	VALUE
network	ManagedObjectReference:Network[]	network-13 (Management-Network)

8. In the page that opens, in the row on **name**, copy the name of the network interface or portgroup. This value is to be used in the **Interface** field in the Infra Provider policy wizard.

   For example:

Name	TYPE	VALUE
name	string	Management-Network

   Here, **Management-Network** is the value you must provide in the **Interface** field.

Note If there are spaces or special characters in the name string, you need to encode it using a URL encoder.

Editing Kubernetes Cluster Policy

To edit a policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Select the policy that you want to edit, and then click the **Edit** icon.

Deleting Kubernetes Cluster Policy

Before you begin

Ensure that the policy that you are going to delete is not attached to any profile.

To delete a policy:

1. In the left pane, click **Policies**.

   The **Policies** screen appears, displaying the list of available policies.

2. Select the policy that you want to delete, and then click the **Delete** icon.

IKS application visibility and right-sizing using Intersight Workload Optimizer

You can install Intersight Workload Optimizer (IWO) on an IKS cluster for gaining visibility and right-sizing IKS applications.

The Helm v3 and network requirements for using the IWO Kubernetes Collector are met in the IKS cluster environment. For information on deploying the IWO Kubernetes collector, see the instructions for **Helm v3** in the **Deploying the Intersight Workload Optimizer Kubernetes Collector** section in Cisco Intersight Workload Optimizer Target Configuration Guide.

Open Caveats

This section describes the caveats and workarounds for common issues when using Intersight Kubernetes Service.

	Workaround
CSCvx27447 - Push cached images to tenant registry When you import a new VM template into vCenter, it has a name format that is shorter because “ubuntu” is replaced with “u”. This consumes additional storage space.	To recover storage space, you can delete the obsolete template iks-ti-1-18-12-ubuntu18-94a8577-2-0b919b.

	Workaround
CSCvw50943 - Incorrect style applied to Create button in the Infra Provider Policy page The **Create** button in the Infra Provider Policy page is enabled even if the mandatory fields are not filled. Moreover, there are no error messages displayed when you click the **Create** button without entering the mandatory fields. This is a button styling issue.	There is no known workaround for this issue.
CSCvw81794-Unable to use the IKS-ONLY-VLAN1177-10.12.100.0/22 network While creating an Infrastructure Provider policy, IKS VM creation fails if you configure the **IKS-ONLY-VLAN1177-10.12.100.0/22** network in the **Interface** field.	Use a network other than IKS-ONLY-VLAN1177-10.12.100.0/22.